DOCUMENT RESUME

ED 332 281 EA 022 374

TITLE	Cooperative Learning. What We Know About Series.
INSTITUTION	Educational Research Service, Arlington, Va.
PUB DATE	90
NOTE	35p.
AVAILABLE FROM	Publication Sales, Educational Research Service, 2000 Clarendon Blvd., Arlington, VA 22201 (Stock No. 227-00001; $12.00 plus $2.50 on prepaid orders).
PUB TYPE	Guides - Non-Classroom Use (055) -- Reports - Descriptive (141)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Academic Achievement; Classroom Techniques; Cooperative Education; *Cooperative Learning; Elementary Secondary Education; Ethnic Groups; Group Activities; Learning Strategies; Mainstreaming; Self Esteem; *Student Participation; Teaching Methods; Teamwork

ABSTRACT

Instructional methods that seek to promote learning through student cooperation, rather than competition, are discussed in this handbook. Sections include an outline of the characteristics of cooperative learning techniques; a summary of research on the effects of cooperative learning on academic achievement, ethnic relations, mainstreaming, and student self-esteem; and a discussion of teacher, student, parent, and administrator roles. Eight major cooperative learning methods are described: (1) Student Teams Achievement Divisions; (2) Teams Games Tournament; (3) Team Assisted Individualization; (4) Jigsaw (using an individual incentive structure); (5) Jigsaw (using a cooperative incentive structure); (6) Cooperative Integrated Reading and Composition; (7) Learning Together; and (8) Group Investigation. Information is provided for each method as to the subjects for which it is appropriate, group structure, incentive structure, developers of the technique, grade level range, student assessment, and how it "works." All the methods have students organized in groups of two to six members. (25 references) (LMI)

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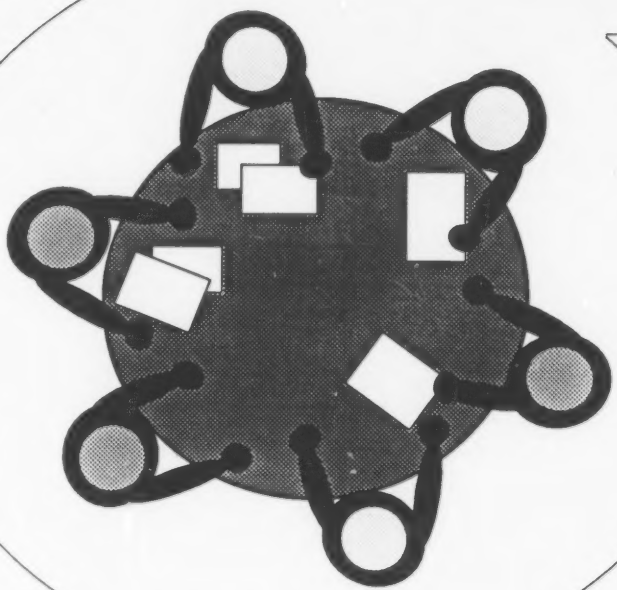

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Stock #227-00001

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FOREWORD

This is the first in a series of ERS publications designed to present in a brief and understandable way what is currently known about specific practices and issues of high interest in the education of children and the operation of schools. Each publication in this series will provide readers with a balanced, objective discussion of the practical research, relevant information, and informed opinion contained in the professional literature on the subject. The series will offer concise but comprehensive overviews of topics for teachers, parents, board members, administrators, and concerned citizens.

What We Know About: Cooperative Learning discusses instructional methods which seek to promote learning through student cooperation, rather than competition. Its purpose is not to advocate the use of cooperative learning methods, but to objectively describe and explain what cooperative learning is, to summarize the research related to its effectiveness, and to outline how it can be used appropriately in the teaching/learning process. This practical overview of the topic is designed to help those who are considering the use of cooperative learning techniques to improve student achievement and attitudes.

The publication begins with a brief outline of the characteristics of cooperative learning techniques, including a description of those specific techniques that have been the most widely used, discussed, and studied. This is followed by a summary of the research on the effectiveness and limitations of cooperative learning related to outcomes such as academic achievement, ethnic relations, mainstreaming, and student self-esteem. Finally, the roles of teachers, students, administrators, and parents in the successful implementation of cooperative learning are discussed.

More detailed and comprehensive information about this topic is contained in the 208-page ERS Information Folio *Cooperative Learning*, available to ERS subscribers on short-term loan or for purchase on a cost-replacement basis.

Glen E. Robinson
Director of Research
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COOPERATIVE LEARNING

Competitiveness, found throughout American society, is also prevalent in our educational system. In most classrooms, students are ranked by a grading system based on individual achievement. In recent years, however, cooperative learning has been introduced as an alternative to the traditional competitive classroom atmosphere.

Decisions about *whether to use* cooperative learning approaches and following that, *what method to use*, require a thorough understanding of the basic concepts on which cooperative learning is based.

WHAT IS COOPERATIVE LEARNING?

Cooperative learning is often defined as a method of classroom instruction in which students are placed in small groups and work together to achieve a common goal. Such definitions of cooperative learning are broad generalizations applied to a variety of instructional strategies having the common purpose of promoting student cooperation rather than competition in the learning process.

To implement cooperative learning effectively in the classroom requires thoughtful decisions and careful planning about both the type of tasks involved and the incentives to be employed. Certainly, all learning settings involve basic decisions about the task structure and the incentive structure, but the use of cooperative learning strategies requires that special attention be given to the types of tasks and incentive structures employed.

COMMON ELEMENTS OF COOPERATIVE LEARNING METHODS

All cooperative learning methods require students to perform highly structured group tasks. Although there are significant differences among the various methods, they share these general characteristics:

- Classes are divided into small groups with 2 to 6 members.
- Groups have an interdependent structure with high individual accountability.
- Clearly defined objectives are specified for the groups.
- A cooperative environment and a reward system are present within the group.
- Students support each others' efforts to achieve.
- There is monitoring of group member behaviors. (14:5)

One difference in the way that cooperative learning is applied in different settings cuts across most approaches. In addition to variations on task and incentive structures, cooperative learning groups may be either *heterogeneous* or *homogeneous* in terms of ability level. *Heterogeneous* grouping, according to Johnson and Johnson, is preferred because it causes students to have a greater affinity for classmates of a variety of ability levels. On the other hand, this can cause difficulties if groups are not very carefully assembled with the right mix of students and with appropriate incentive structures. (6:3)

MAJOR COOPERATIVE LEARNING METHODS

Eight major types of cooperative learning methods and strategies are described in the professional literature. Descriptions of these eight approaches follow.

Since the particular methods vary in their degree of effectiveness for different grade levels and for different subject matter, selection of an appropriate method is a major factor in determining the impact of cooperative learning on student achievement. As with any other instructional technique, no one cooperative learning method

can be used to teach every subject and every grade, but there are some that overlap.

Major Cooperative Learning Methods

- Student Teams Achievement Divisions (STAD)
- Teams Games Tournament (TGT)
- Team Assisted Individualization (TAI)
- Jigsaw
- Jigsaw II
- Cooperative Integrated Reading and Composition (CIRC)
- Learning Together
- Group Investigation

Student Teams Achievement Divisions (STAD)

The STAD method, developed by Robert Slavin, combines a *group-study task structure*[1] with a *cooperative incentive structure*[2] in which students receive a *group reward* for *individual learning*. According to Slavin, the STAD method can be useful in teaching material with single right answers such as mathematics, science, or foreign languages, but it is not appropriate for teaching reading or writing. Slavin believes the method is appropriate for students in grades 2-12.

Implementation of this method begins with whole-class instruction by the teacher, which takes from one to two class periods. The classroom is then divided into the characteristic 4- to 6-member heterogeneous groups. In groups, students work for one to two class periods to help each other master the material. The teacher hands out only two worksheets per group so that those in the group must work together. Students are told by the teacher to work in pairs or threes on the worksheets within each group. The point is emphasized to the students that they are not finished studying until everyone in the group understands the material.

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[1]All group members study the material together and do not have separate tasks.

[2]A student can achieve his or her goal — good grades, teacher praise, etc. — only if the other students in his or her group achieve theirs.

Following this group study, students take individual quizzes. After each quiz, group and individual improvement scores are computed. The teacher produces a weekly newsletter recognizing groups or individuals who do especially well.

This cooperative learning method requires the use of a rather complex system to compute group and individual improvement scores. After having been ranked according to past performance and teacher judgment, students are placed accordingly into ability group "divisions" comprised of six people, the highest ranked six being Division 1, the next highest being Division 2, and so on. In theory, the students are not aware of the existence of these divisions; they are simply used by the teacher as a tool for translating quiz scores into team points.

Individual improvement scores are computed by comparing the score each student makes on the two weekly quizzes with the student's base score (which is set at five points below the student's average). For each point by which a student exceeds his or her base score, he or she receives points toward the group score.

Group scores are computed by comparing an individual group member's quiz score to the scores of other students within his or her ability group division. The maximum number of points a student can contribute towards his or her group's overall score is ten, which is given to the person within each ability group division who has exceeded his or her base score by the most points. Six points are given to the second highest scorer, four points to the third highest, and all others contribute two points to their group score.

This system allows lower ability students the chance to contribute the maximum number of points towards their group's score, because they are only being compared to those of similar ability. The consistently high scorers in each division cannot prevent others in their division from achieving this position, because when a high scorer dominates this position too long he or she is "bumped" into the next highest division, thus providing stiffer competition. The ability groups are kept roughly equal in size by dividing groups that become too large into two.

From the standpoint of an individual student's grades, the use of group scores adds to the motivational impact of cooperative learning. The decision to include or not include group scores in a student's

final grade in a class is up to the teacher. Slavin notes, however, that "if team grades count too much toward individual student grades, high achievers will view the system as inequitable." (20:11) Periodically throughout the year, the teacher will need to adjust the students' base scores and reassign students to different groups.

Teams Games Tournament (TGT)

The TGT method, developed by Robert Slavin and Edward DeVries, uses a *group-study task structure*, with a *cooperative incentive structure* in which students receive a *group reward* for *individual learning*. TGT, like STAD, is designed for use in teaching material with single right answers such as mathematics, science, social studies (with skills like geography and graph reading), or foreign languages in grades 2-12. It is not appropriate for teaching reading and writing.

The basic difference between this method and the STAD method is the use of weekly tournaments to demonstrate individual student learning.

Students are ranked according to past performance and grouped in 3- to 4-member "teams." For example, each team may consist of a high achiever, two average achievers, and a low achiever. The teams are also as heterogeneous as possible in terms of sex and ethnicity.

Implementation of this method begins with whole-class instruction by the teacher, which normally lasts one to two class periods. The teacher assigns students to teams and hands out two worksheets to each team. Working together to complete the worksheet, teams study the material until everyone in the group has an understanding of it.

Weekly, students demonstrate their individual ability in tournaments in which they compete as representatives of their group with students at their own ability level. Students are assigned to "tournament tables" consisting of, for example, three high achievers from different groups, three average achievers from different groups, or three low achievers from different groups. "Skill exercise sessions which focus on the current subject matter are played during the tournament. At each three-person game table, students answer questions posed on card sets or game sheets to demonstrate mastery of specific skills." (2:29)

Team scores are calculated based on each member's performance in the tournament. The top scorer at each table is given six points, the second scorer is given four points, and the third scorer is given two points. The points each student receives are added to those of his or her teammates in order to form a team score. A newsletter recognizing successful teams and excellent individual performances is distributed. Periodically throughout the year, the teacher reassigns students to different teams based on changes in their performance.

Team Assisted Individualization (TAI)

This method, developed by Robert Slavin, Marshall Leavey, and Nancy Madden, uses a *group-study task structure*, with a *cooperative incentive structure* in which students receive a group reward for individual learning.

The TAI method differs from the other methods in that it was designed to be used in grades 2-8 almost exclusively for mathematics, and in classes that are too heterogeneous to be taught the same material at the same rate. Students work as a part of a team, but they work at their own pace on materials designed for their ability level as determined by placement tests. In a classroom with mainstreamed children, for example, teams provide the needed positive social interaction, and the more individualized pace gives these students the opportunity to learn at their own speed and level. (17:27) Teams are made up of a heterogeneous mix of high, average, and low achievers. In these teams, students help each other master the skills and content.

TAI also uses homogeneous "teaching groups" which consist of all of the high achievers in the class, or all of the average achievers, or all of the low achievers. These groups meet for 15 to 20 minutes every two to three days to receive instruction from the teacher on a new lesson, which is then practiced in the teams. Students do worksheets, which are parts of a "unit," the objective being to complete as many units of worksheets as possible. Teammates form pairs to check each other's work against answer sheets. When students complete a unit, they take a Unit Test; when a certain number of units have been completed, a Cumulative Mastery Test is taken. Scores received on both these tests and the number of units completed each week are used to form a team score.

The best teams – that is, those whose members have completed the most units or received the highest scores on tests or worksheets – receive teacher and class recognition in the form of certificates.

Jigsaw

The Jigsaw method, developed by Elliot Aronson, uses a *task-specialization task structure* [3] and an *individual incentive structure.*[4] This method of cooperative learning was designed for teaching material that comes from reading, such as literature, social studies, or science in grades 3-12.

As with other cooperative learning methods, students using Jigsaw are divided into 5- to 6-member heterogeneous groups. Groups are assigned a lesson, "usually a chapter, a story, a biography or similar narrative or descriptive material" (21:42), and each member of a group is responsible for becoming an "expert" on a section of it.

Students first meet with members of other groups who are responsible for the same section. After studying/completing/mastering his or her own section, each group member is expected to teach that section to other members of the group. A quiz is then taken covering all sections, and quiz scores of each individual group member contribute only to individual grades.

In Jigsaw, quiz scores contribute to individual grades and not to a group score; in this way the incentive structure varies from those normally included in cooperative learning approaches. However, this method is still considered cooperative learning since the students depend on each other in order to learn the entire lesson and not just their section.

Jigsaw II

This variation on the original Jigsaw method was developed by Robert Slavin. Jigsaw II can be used under the same circumstances (as far as subject and grade) as the original Jigsaw. The difference between Jigsaw and Jigsaw II is that Jigsaw II uses a *cooperative incen-*

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[3]Every member of a group is responsible for learning and teaching a unique part of the lesson.

[4]A student can achieve his or her goal regardless of whether or not others achieve theirs.

tive structure in which students receive a group reward for individual learning.

In Jigsaw II, every member of the group reads the same lesson once, and then each person is assigned a section of that material on which to become an "expert." As in Jigsaw, the students meet in cross-team expert groups, teach their section to their own team, and then take individual quizzes on the entire lesson. Unlike Jigsaw, however, individual quiz scores are combined to form a total team score.

Cooperative Integrated Reading and Composition (CIRC)

This method, developed by Robert J. Stevens, Nancy Madden, Robert Slavin, and Anna Marie Farnish, uses a *group-study task structure*, with a *cooperative incentive structure* in which students receive a group reward for individual learning. As the name implies, this method was specifically designed for use in teaching reading, composition, and language arts.

Implementation of this method begins with student assignment to a higher or a lower reading group according to reading ability. Heterogeneous teams, composed of equal numbers of students from these two different ability-based reading groups, are formed. Teams are ideally made up of two students from the higher level reading group and two from the lower level group. Students form same-ability-level pairs within their team and read aloud to each other, with the listening student responsible for following along and correcting any errors the reader may make. Within these same pairs or with their other teammates, students test each other on new vocabulary words in the story they read, summarize the main points of the story, write open-ended pieces on a topic related to the story, and perform other related activities.

For approximately 20 minutes each day, the teacher works with one ability-based reading group while the other students work in their teams on various reading or composition-related activities. "During these teacher-led sessions, the teacher sets a purpose for reading, introduces new vocabulary, reviews old vocabulary, discusses the story students have already read, and so on." (23:1) At the end of three class periods, each student takes a comprehension test on the material. Team scores are computed based on individual test scores.

Learning Together

This method, developed by David Johnson and Roger Johnson, uses a *group-study task structure*, with a *cooperative incentive structure* in which students receive a group reward for a group product. Learning Together involves the highest degree of cooperation between students, and can be used for most subjects. Experiments using this method have been done with students in grades 2-6.

This method begins with whole-class instruction by the teacher. Assignment sheets are then completed cooperatively by the group and handed in as a group product. Students are rewarded based on the performance of the entire group.

Group Investigation

This method, developed by Shlomo Sharan, uses a *task-specialization task structure*, with a *cooperative incentive structure* in which students receive a group reward for a group product. Useful in teaching most subject areas and grade levels, this method was designed to encourage creative thinking and group- and self-organization.

Implementation of this method begins with students forming 2- to 6-member groups, with groups choosing sections of a main lesson. The students then divide their group's section into individual tasks and prepare a group presentation of the topic to the entire class. (15:17-20)

RESEARCH ON THE EFFECTS OF COOPERATIVE LEARNING

One of the most striking features about the results of cooperative learning research is its complexity. The research does not only compare the effects of cooperative learning directly with more traditional classroom structures. Since the approaches to cooperative learning themselves vary significantly, some of the studies both compare the effects of several cooperative learning techniques and review the effects of non-cooperative approaches.

In addition, researchers have focused on a variety of outcomes. Does cooperative learning – or one particular type of cooperative learning – result in increased student achievement? Is

there a relationship between the use of cooperative learning and the way students feel about themselves, other students, and the school experience? Does cooperative learning work better with particular ethnic groups, or better with boys or girls? Can cooperative learning contribute to efforts to successfully mainstream students? Can it help to produce better interpersonal relationships between students of different ethnic groups? Does its effectiveness vary for students of differing ability levels?

Effects of Cooperative Learning

Academic Achievement

- Effects on Ethnic Groups

Non-Achievement Measures

- Ethnic relations
- Self-esteem and liking of others and of school
- Mainstreaming of academically handicapped students

Academic Achievement

While research on cooperative learning has studied all the questions cited above, the primary focus has been on the academic achievement of students. Although the majority of the research done to determine the effect of cooperative learning on individual academic achievement has shown positive results, care should be taken when attempting to generalize these results to actual classroom settings. The results of a particular study of achievement effects depend on several variables, including subject area, the age group or grade of the participating students, the size of the groups, the duration of the study, and the cooperative learning method used. The large number and wide variety of variables are reasons for caution when interpreting the results of cooperative learning and student achievement studies.

Another reason for caution, pointed out by Robert Slavin, is that many studies measure group productivity as opposed to individual achievement even though individual achievement is a primary concern when attempting to identify ways to increase student learn-

ing. (22:430) It is useful, however, to summarize the findings of several of the most generalizable of the studies.

One study, a meta-analysis which combined and analyzed the results of several different studies, was done by David Johnson and others. In their review of 122 studies looking at cooperative learning and achievement (although group productivity was not differentiated from individual academic achievement), they attempted to answer three questions:

1. Does cooperation promote higher achievement than competition, or vice versa?
2. Does cooperation promote higher achievement than individualistic efforts, or vice versa?
3. Is intergroup competition necessary for cooperative learning to be effective?

With respect to the three questions, the researchers found that cooperation promotes higher achievement than interpersonal competition or individual efforts "in all subject areas, . . . age groups, . . . and for tasks other than rote decoding and correcting . . . and that cooperation without intergroup competition promotes higher achievement and productivity than cooperation with intergroup competition." (This is a very tentative conclusion because the number of findings that directly compared the two conditions was too small for a firm conclusion.) (9:56-57)

Robert Slavin reiterated his concern about cooperative learning/student achievement studies in a 1983 review of the research on cooperative learning and student achievement. He pointed out that "working in a group under certain circumstances does increase the learning of the individuals in that group more than would working under other arrangements, but a measure of group productivity provides no evidence one way or the other on individual student achievement." (22:430) In his review, he looked at 46 studies to determine the effectiveness of cooperative learning in increasing *individual* student academic achievement. "Of the 46 studies 63 percent showed cooperative learning methods to have significantly positive effects on student achievement." (22:434)

"Of the 46 studies 63 percent showed cooperative learning methods to have significantly positive effects on student achievement." (22:434)

Slavin also analyzed the overall results by type of incentive structure and type of task structure. The incentive structure used was found to have a strong effect on student achievement. "Of 27 studies that use group study and group rewards for individual learning 89 percent found positive effects on student achievement . . . whereas those nine studies that did not use this incentive structure did not find positive effects on student achievement." (22:438) Slavin found that those methods using *individual rewards and task specialization*, did not increase student achievement, but that those using *group rewards and task specialization* did. Slavin concluded that, in order for cooperative learning to significantly increase student academic achievement, methods that use task specialization and provide group rewards with individual accountability should be used.

EFFECTS ON ETHNIC GROUPS

In addition to studies focusing on the relationship of cooperative learning techniques to student achievement in general, some research has targeted the effects on students of different racial groups. In some cases, cooperative learning was found to be more likely to increase the academic achievement of non-white students than that of white students, with the researchers hypothesizing that non-white students may be more receptive to cooperative learning methods than white students.

Three studies reviewing the effects of cooperative learning on achievement of students of different racial-ethnic groups (Lucker, et. al. 1976, Slavin 1977, and Slavin and Oickle 1981) found this to be true, although a 1979 study by Slavin did not. Slavin and Oickle found that, while cooperative learning tends to increase the achievement levels of all students, the improvement is greater for black students than for white students. Slavin and Oickle hypothesized that, because the peer group seems to be more important for black students than for white students, they are more cooperatively predisposed, and therefore mobilization of the peer group to support achievement has a greater impact on them. (16:179)

In studies done by Slavin (1977), Slavin and Oickle (1981), and Edwards, DeVries, and Snyder (1972), similar conclusions were reached relating to the cultural differences between Hispanic students and students of other races. It was observed that cooperative learning methods seemed to produce better results for black and Mexican-American students. (17:61-62) One possible explanation for this, according to Slavin, is that "there is something in black and Hispanic cultures that supports cooperation as a motivational system. Black and Hispanic children's self-esteem seems to depend more on how they see themselves getting along with their peer group than how they are doing academically, while the reverse is true for whites." (17:62)

NON-ACHIEVEMENT MEASURES

Some studies have dealt with the effects of cooperative learning on ethnic and social relations, mainstreaming of academically and physically handicapped students, attitudes of students towards each other and towards school, and student self-esteem. The majority of the research provides evidence of positive results of cooperative learning on these factors. However, the results depend heavily on the cooperative learning method used, the setting of the study, the experimental design, and the measures used to determine outcomes.

ETHNIC RELATIONS

Social scientists are inclined to believe that the conditions under which previously segregated groups first come in contact with others in desegregated conditions make a significant difference. From the standpoint of students and the formation of cross-race friendships among them, the fact that "Black, Hispanic, and Anglo students typically live in different neighborhoods, ride different buses, and prefer different activities, works against friendship formation even when race is not a factor." (19:54) Available evidence suggests that "cooperation across racial lines, equal-status roles for students of different races, contact across racial lines that permits students to learn about one another as individuals, and the communication of unequivocal teacher support for interracial contact" are important to the positive outcome of desegregation. (19:48)

Researchers also report that positive inter-ethnic relations do not occur as a result of desegregation on their own; specific interven-

tions aimed at improving race relations are needed. Research indicates that cooperative learning methods provide many of the conditions necessary. In classes using cooperative learning, students of different races are provided with a new basis for similarity, developed through genuine cooperative interaction.

There have been several different approaches to studying the effect of cooperative learning on race relations. One approach has been to compare the number of cross-race friendship choices occurring when cooperative learning methods are used with the number occurring in "traditional" competitive classroom settings. The most popular way to determine "liking" is the use of a sociometric questionnaire asking students to list the names of classmates whom they consider their friends in school. The numbers of cross-race and within-race choices are then counted.

Hansell and Slavin, in a 1981 study, used this method and found that more cross-race friendship choices were made when cooperative learning was used than in the traditional classroom situations. (A control for possible pre-experiment friendships between students of different races was included in the study by giving pre- and post-experiment sociometric questionnaires.) Neither pre-existing status nor power differences had substantial effect on post-experiment friendship choices.

In this case, as in other cases involving the use of cooperative learning methods, the careful placement of students into groups and choice of method are of vital importance in producing positive results.

It is easy to assume then that the characteristics of the cooperative learning situation itself – mutual interdependence, equal status, etc. – were the causes of the increase in cross-race friendships. However, it is important to realize that other factors such as "the mere physical proximity of black and white students in a cooperative setting" may instead be the reason. (3:104) In a few cases researchers have attempted to determine the *strength* of the cross-race friendships formed, in addition to the *frequency* of the relationships. In the above mentioned Hansell and Slavin study, students' friendship choices were considered "close" or "strong" if they were among the first six made on the questionnaire. The number of instances in

which these choices were reciprocated between students were also counted. The number of strong cross-race friendships were significantly higher in those classes using cooperative learning methods.

Another approach has been to look at the number of cross-race *helping behaviors* that occur when cooperative learning methods are used. These behaviors have been measured either by observation of students during the experiment or by asking the students after the experiment whom they had helped and who had helped them.

A study done by Weigel, Wiser, and Cook (25:233) measured the frequency of cross-ethnic helping behaviors exhibited by the students in their experimental group, which used a variation on the Group Investigation method using between-group competition. They found that "the frequency of cross-ethnic helping behavior was five times greater" in the experimental group.

It is important to remember, however, when looking at the significance of these findings, that working in small groups as opposed to receiving whole-class instruction is going to require more communication between students, so the overall chance of two students from different ethnic groups helping one another would be greater.

Weigel, Wiser, and Cook also looked at the frequency of cross-ethnic interpersonal conflicts. They found significantly fewer instances of conflict between members of different races in the experimental group – 45 percent of the total instances of conflict as opposed to 90 percent in the whole-class instruction situation. However, the overall level of conflict for either the experimental or the control group was so low that the researchers were not inclined to attach much significance to differences between the two types of classes, but rather to look at this as an interesting result of their investigation.

Research in the area of cooperative learning and race relations has also focused on the possibility that specific subgroups of students made or received more than their proportionate share of new cross-race friendship choices within a cooperative learning setting. For example, those students who make the highest grades in the class, those who have a certain degree of preexisting social status, or those students who are white may tend to receive the majority of the new inter-ethnic friendship choices. Hansell and Slavin (3:104) examined this possibility and found that this was not the case. They

discovered that strong cross-race choices were made and received equally by those of differing status, achievement levels, and races.

Although cooperative learning and ethnic relations research has rather consistently found that liking among students of different races increases when cooperative learning methods are used, there is an important limitation to the usefulness of the cooperative learning/ethnic relations research. If, for example, a teacher's main objective in implementing cooperative learning is to improve ethnic relations in the classroom, current research is not available to indicate a best method to use.

Although several of the major methods have been used in experiments designed to measure ethnic relations, they have been used in such a variety of circumstances (i. e., length of study, heterogeneity of the experimental or control groups, etc.) that no specific direction is indicated at this time, with the possible exception of Student Teams Achievement Divisions (STAD) which is the method that has been studied the most and has produced the most consistently positive results. In this case, as in other cases involving the use of cooperative learning methods, the careful placement of students into groups and choice of method are of vital importance in producing positive results.

STUDENT SELF-ESTEEM, LIKING OF OTHERS AND OF SCHOOL

Cooperative learning has also been found to affect students' liking of others, of themselves, and of school by improving peer relationships and success in school work.

The results of the research currently available on the effects of cooperative learning on *student self-esteem* tend to be positive but inconsistent. For example, Robert Slavin, after completing an analysis of the research on this subject, found that seven of ten studies he examined showed positive results and three indicated no difference between the two approaches. He also points out that, although the results of the research suggest that lasting changes in student self-esteem might be brought about by long-term implementation of cooperative learning, "a dramatic change in such a central part of students' psychological makeup" cannot be expected as a result of an experiment lasting a few weeks. (17:110)

The methods used to determine how well students *liked school* as a result of cooperative learning interventions tend to indicate that

there is no significant difference between how much a student likes school before an experience with cooperative learning and how much he or she likes it afterwards. The students were asked on a pre- and post-experiment questionnaire *only* whether they liked school or class *in general*, not whether they liked it better after their cooperative learning experience than before. In most studies students were not asked directly whether they liked the traditional or the cooperative learning class better.

Researchers have also studied the effect of cooperative learning on students' *liking of their classmates*, with positive effects presumably due to the increased interaction with one another and the interdependence brought about by small group work. Studies have been done using each of the cooperative learning methods. Questionnaires asking students "Who are your friends in this class?" or scale measures of "I like the other students in this class" and "The other students in this class like me" have been used to measure increased liking of classmates. (17:116) Although the evidence to demonstrate this relationship has not been conclusive, the majority of it has been positive.

MAINSTREAMING OF HANDICAPPED STUDENTS

Since the mandate of Public Law 94-142 requiring placement of physically and academically handicapped children into regular classrooms whenever possible, various methods have been tried to increase their academic achievement as well as prevent social rejection of these children by their peers. Cooperative learning is one such method.

At first glance, teaching techniques using an individualistic incentive structure may appear to be the best way to accommodate the diverse needs of mainstreamed students. However, the results of research on the effectiveness of cooperative learning used with mainstreamed classrooms have pointed to benefits that can be achieved when cooperative learning is carefully and appropriately implemented. Part of the reason is that individualized programs tend to isolate students from one another, thus preventing interaction between handicapped and non-handicapped students, whereas interaction is an integral part of cooperative learning methods.

In general, the research on mainstreaming and cooperative learning has focused on two main issues:

1. Academic achievement of both academically handicapped and non-handicapped students in a cooperative learning setting.
2. The cross-handicap relationships formed in a cooperative learning situation.

Most studies that were aimed at determining academic improvement for both academically handicapped and non-handicapped students as a result of cooperative learning interventions found that although achievement improved for academically handicapped students, the improvement was not statistically significant. It should be noted, however, that "the academically handicapped students in the experimental groups (that is, those using cooperative learning interventions) outperformed those in control groups by a larger amount than normal-progress students in the experimental groups exceeded those in traditional control groups." (17:100)

On a less positive note, the academic achievement of both mainstreamed learning-disabled students and the non-learning disabled who were grouped with them in a cooperative learning situation was also investigated by Cosden, Pearl, and Bryan in a 1985 study. These researchers found that the "benefits claimed for cooperative goal structures may not always be forthcoming." (17:113) Students participating in this study who were not learning-disabled performed better academically after individual study than after study with a learning-disabled partner.

Successful mainstreaming depends heavily on the way in which interaction among students is structured. Research indicates that cooperative learning methods, through interdependence, can promote more positive attitudes towards handicapped students by their peers. For example, in the study done by Johnson, et al., a cooperative goal structure was found to promote more support, praise, encouragement, concern, and acceptance between educable mentally retarded teenagers and their non-handicapped peers than did an individualistic goal structure.

Within the research on cross-handicap relationships formed in a cooperative learning situation, studies have focused on two separate issues – quantity and quality of the relationships. It was found,

in general, that both the quantity and the quality of cross-handicap relationships increased when cooperative learning methods are used.

For example, a 1984 study done by Slavin, Madden and Leavey examined the effect of the Team Assisted Individualization (TAI) method on mainstreamed academically handicapped students' nominations as "best friends" by non-handicapped students. The study found that the handicapped students were chosen as friends more often in the TAI classrooms than in the "traditional" control classrooms.

In studying the *quality* of cross-handicap friendships, one measure is an examination of the generalizability of such friendship choices to free-time noninstructional situations. In a 1981 study, Johnson and Johnson observed the number of times a cross-handicap interaction occurred during the two 30-minute free-time sessions given at the end of each section of the study. "On the average there were 48 interactions per session between the handicapped and non-handicapped students in the cooperative condition and only 16 such interactions in the individualistic condition." (4:420)

In a 1986 study by Johnson, Johnson, Warring, and Maruyama, students in cooperative and individualistic classrooms were each given a list of nine outside-class activities such as: ate lunch with, invited to your house, and talked with on the telephone, and then given a list of the names of the other students in the class. Next to each activity they were asked to write the names of all of the students with whom they had done the activity. Overall, more cross-handicap choices were listed by students in cooperative learning settings. (11:251)

Although the results of use of cooperative learning in mainstreaming situations have been mostly positive, there have also been negative consequences which cannot be ignored. Mainstreaming academically or physically handicapped students carries with it not only the opportunity to reduce rejection and stigmatization of these children but also the risk of making the situation worse. Physical proximity between students alone cannot produce the desired results; in fact, "this may even increase prejudice, stereotyping, and rejection of physically and academically handicapped students." (12:161) The way a mainstreamed classroom is designed and implemented by the teacher is the key to its success.

In situations involving interdependence between handicapped students and their non-handicapped peers, there may be concerns and anxieties felt by both groups. The non-handicapped students may be concerned about having their grades adversely affected by interdependence with handicapped peers, and the handicapped students may be worried about being placed in an unfamiliar situation requiring extensive interaction with non-handicapped students.

It is necessary to pay "careful attention to positive interdependence, individual accountability, collaborative skills," and instruction of non-handicapped students on the most effective strategies for working with their handicapped peers. (7:559)

In some cases, the handicapped students have been criticized more by their non-handicapped peers as a result of the between-group competition involved in some cooperative learning methods. For instance, if a cooperative learning method such as Jigsaw is used in which each student is responsible for a section of the lesson on which the group will be tested, the non-handicapped students might be more likely to reject or stigmatize a handicapped peer if that person cannot adequately "teach" his or her section to the rest of the group. A similar situation can occur if, for example, the Learning Together or Group Investigation methods in which students receive a group reward based on group performance are used, and the one or two mainstreamed students in the group are unable to contribute their "fair share" to the group effort. It is necessary to pay "careful attention to positive interdependence, individual accountability, collaborative skills," and instruction of non-handicapped students on the most effective strategies for working with their handicapped peers. (7:559)

Some Factors to Consider When Implementing Cooperative Learning

Research provides assistance in identifying factors that may be important in increasing the positive effects of cooperative learning on student achievement and attitudes. The implication for educators is that different skills may have to be stressed for different types of students.

For example, Johnson and Johnson studied the interactions between student ability, interaction patterns in the groups, and achievement. Their findings - that "different types of vocalization relate to achievement for high-, medium-, and low-achieving students," and that "vocalizing on the subject to be learned was much more important for achievement than listening to collaborators vocalize" - are significant for those wishing to successfully implement cooperative learning. (10:318) In order to maximize learning, they suggest, low-achieving students should be taught to discuss task-related information and to be willing to express disagreement with other members' conclusions, while those students at the medium-achieving level should be taught to provide agreement and disagreement with the conclusions reached by the other members of the group.

Students need to be educated about their roles and responsibilities in the groups, as well as about the communication skills necessary for success in a cooperative learning program.

There is also an indication of significant sex differences in the interaction patterns and achievement of students in cooperative learning groups. A study of students in grades 7 and 8 conducted by Webb indicated that "even though males and females had comparable ability, males outperformed females on an achievement test" after participation in a cooperative learning group. This was partly a result of the "greater success of males than females in obtaining information and explanations from other group members . . . because of the tendency on the part of both females and males to ask males for help and the tendency for the females to be ignored even when they asked for help." (24:43) Consequently, Webb recommends that girls be taught to persist in their efforts to obtain information when working in a group.

Implementation of cooperative learning methods involves role changes by both students and teachers. The students are required to take on more of the responsibility for their own learning, and the teachers must be willing to allow this to happen by giving up some of their control over how their students learn. Assuming that

these conditions will just happen naturally may result in a less successful implementation of cooperative learning.

Students need to be educated about their roles and responsibilities in the groups, as well as about the communication skills necessary for success in a cooperative learning program. Teachers need to provide students with the appropriate structure, communication skills, and information. "Doing so requires that teachers communicate to students the need for social skills, define and model these skills, have students practice them over and over again, process how effectively students perform the skills, and ensure that students persevere until the skills are fully integrated into their behavioral repertoires." (8:32) Explaining answers, asking questions, and criticizing ideas, not people, are examples of such social skills.

SUCCESSFUL IMPLEMENTATION OF COOPERATIVE LEARNING

Teachers, students, administrators, and parents all have important roles to play in the successful use of cooperative learning in the school.

ROLE OF THE TEACHER

Teacher preparation and training should pave the way for implementation of a cooperative learning program. After having determined in a 1975 study that implementation of the Jigsaw technique improved inter-ethnic relations, Elliot Aronson used a five-day summer workshop for teachers to help them successfully begin a cooperative learning program. The workshop included having the teachers work with each other in cooperative and competitive situations so that they could experience the difference firsthand and get an idea of how students feel in those situations. Workshops such as the one given by Aronson should also include an "observation and reflection" session in which the teachers discuss the professional and personal significance of the cooperative experience.

In addition to participating in training sessions such as Aronson's, teachers can make use of the following set of guidelines, which is a condensed version of those prepared by David and Roger Johnson. The guidelines can help teachers design a cooperative learning program for their classroom.

1. Clearly specify the objectives for the lesson, including both the task and goal structures, as well as the small-group collaborative skills that will be emphasized during the lesson.

2. Plan the instructional materials to promote interdependence. Teachers should distribute materials in ways that communicate that the assignment is a joint effort and that students are in a "sink or swim together" situation. Giving each group member only a part of the materials needed to complete a task or giving only one copy of a worksheet to the group are ways of doing this.

3. Assign students complementary and interconnecting roles. For example, assign students to be summarizers (student restates the major conclusions or answers the group has achieved), checkers (student ensures that all members can explain the group's answer or conclusion), accuracy coaches (student corrects mistakes in another member's explanations or summaries), etc.

4. Observe the students interacting to see what problems they may be having in completing the assignment and in working collaboratively. Provide assistance only in the role of a consultant. Clarify instructions, review important procedures, answer questions only if none of the students in the group know the answer, and suggest more effective procedures and behaviors for working together if groups are having problems cooperating.

5. Evaluate the students' work, give them feedback as to how their work compares to the criteria of excellence, and give the groups time to assess how well they worked together and to plan how to improve their collaboration. (6:2-4)

ROLE OF THE STUDENT

A review of the literature shows that the role of the student in cooperative learning can also be structured to increase success. When cooperative learning is first being implemented, teachers need to establish some specific rules relating to individual behavior within the small groups.

1. Participate actively in your group. Listen to everyone's ideas even if you don't agree.

2. Encourage other members of your group to contribute.

3. If you do not understand part of the assignment, ask the other members of your group before asking the teacher. Be persistent about getting an answer.

4. Remember that the assignment is not finished until each group member understands. Part of your responsibility is answering the questions of other group members and helping them to learn the material.

Role of the Administrator

Administrators have an important part to play in implementing cooperative learning. In order to provide teachers with the support, encouragement, and feedback they need to successfully begin and maintain a cooperative learning program in their classroom, administrators can follow these suggestions drawn from the literature:

1. Be well informed as to the basic elements of cooperative learning, the various methods, procedures for implementation, etc.

2. Do not try to be the only support system for teachers. Instead, set up and manage a system whereby teachers provide professional support for each other.

3. In addition to the pre-implementation teacher training workshops discussed above, provide the needed training courses, classroom materials, and updated information on cooperative learning on a continuing basis.

4. When training teachers, be sure to emphasize not only the procedures involved in implementation of cooperative learning but also the teaching skills required that may be different than those typically used.

5. Publicly support the use of cooperative learning in your school, especially when communicating with parents.

Role of the Parent

Parents can contribute greatly to increasing the benefits of cooperative learning for their children. The following guidelines emerge from a review of the literature:

1. Encourage your child to actively participate in the group activities.

2. Stress the importance of such communications skills as looking directly at the person speaking, nodding and responding when you agree with or understand what the person is saying, not verbally attacking someone when you don't understand or don't agree with him, etc.

3. Encourage your child to be helpful and encouraging towards others in his or her group. This is important because of the "sink or swim together" interdependence of cooperative learning groups.

4. Understand that if your child is a high achiever, his or her progress need not be hindered by the low achievers in the group because many of the cooperative learning methods use individual accountability in grading group work. When the teacher is using such a method, make sure that your child understands this.

CONCLUDING REMARKS

The literature on cooperative learning consists of many articles and books advocating the use of this teaching method but few that point out its disadvantages. It is important to recognize this and keep it in mind when making decisions regarding the use of cooperative learning. For example, although cooperative learning methods have been shown to have a positive effect on students who are mainstreamed, it is possible for these methods to produce negative effects such as greater rejection of these children by their peers if they are unable to do their share of the group's work or if they are seen as slowing the group's progress.

Although research indicates that in many cases cooperative learning can be beneficial to student learning, there are legitimate concerns about the approach that should be recognized and addressed.

Parents of high-achieving students participating in cooperative learning have expressed concern about their children being used as tutors and being held back by those students in the group who are not at the same ability level. Cooperative learning methods that are carefully designed and properly implemented can ease this concern.

Advocates of cooperative learning believe that children enjoy the opportunity to interact with their classmates. But some children

are highly competitive by nature and are motivated to perform better in a competitive situation.

Cooperative learning methods should not be used to teach every subject. Proponents of cooperative learning agree that all three incentive structures – cooperative, competitive, and individualistic – can be used effectively in different classroom settings depending upon the task type and its desired outcome. No incentive structure is best for every type of task, and there are conflicting views as to the tasks with which cooperative, competitive, and individualistic incentive structures can be used most appropriately.

David and Roger Johnson, strong supporters of the use of cooperative learning, have identified conditions under which they believe *competitive* and *individualistic* incentive structures can be productively used to *supplement* cooperative learning. Generally, *competitive* and *individualistic* incentive structures can be effectively used to increase achievement on tasks that are relatively simple and require little help from the teacher or other students. Examples of such tasks are spelling, vocabulary, and certain math activities.

Appropriate and effective implementation of cooperative learning requires a thorough understanding of the concept, specific methods, and roles of teachers, parents, students, and administrators.

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